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THE ORGANIZATION OF A BIOLOGY COURSE FOR INDIVIDUAL PROGRESS AT THEODORE HIGH SCHOOL--AN INTRODUCTION.

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SYSTEMS ANALYSIS AND COMPUTER SIMULATION TECHNIQUES WERE APPLIED IN A STUDY OF THE ORGANIZATION OF A BIOLOGY COURSE FOR INDIVIDUAL PROGRESS. THEODORE HIGH SCHOOL AT THEODORE, ALABAMA, WAS SELECTED FOR STUDY BECAUSE OF ITS APPROACH TO THE ORGANIZATION OF ITS RESOURCES FOR STUDENTS TO LEARN ON AN INDIVIDUAL BASIS. DESCRIBED IN THIS INTRODUCTORY REPORT WERE (1) SCHOOL ENVIRONMENT, (2) PERSONNEL, (3) OBJECTIVES, SPACE, AND FACILITIES, (4) USE OF INSTRUCTIONAL MEDIA, AND (5) ORGANIZATIONAL FEATURES. THE SPECIFIC PROCEDURES FOLLOWED IN INDIVIDUALIZED INSTRUCTION WERE EXAMINED BY FOCUSING ON THE BIOLOGY COURSE ORGANIZATION. THE COURSE HAD BEEN ORGANIZED FOR INDIVIDUAL PROGRESS AND USED A STUDY GUIDE TO DIRECT THE WORK OF STUDENTS. A DETAILED DESCRIPTIVE ANALYSIS WAS PRESENTED IN THE SECOND OF A SERIES OF THREE REPORTS REFERENCED ED 010 566. THE RESULTS OBTAINED BY COMPUTER SIMULATION OF EXPERIMENTAL MANIPULATION OF THE ORGANIZATION OF THE COURSE WERE REPORTED IN ED 010 567. (RS)

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The Organization of a Biology Course for Individual Progress at Theodore High School: An Introduction

ABSTRACT

This Tech Memo is the first of a series reporting the work done with Theodore High School in connection with the study New Solutions to Implementing Instructional Media Through Analysis and Simulation of School Organizations. In this document, Theodore High School, Theodore, Alabama, is described as a total organization in terms of its environment, personnel, objectives, space and facilities, use of instructional media, and its noteworthy organizational features. A rationale for selecting the biology course at Theodore for detailed system analysis and computer simulation is presented.

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I. INTRODUCTION

In SDC Document TM-1493/101/00, Purpose and Strategy of the School Simulation Project, dated 19 December 1963, project personnel stated their intent to use system analysis and computer simulation techniques in an investigation of organizational modifications in education that support the use of instructional innovations. This 2 1/2 year study began with a nationwide survey of high schools to identify a select few that are demonstrating creative approaches in organizing their resources to use innovation. As a result of this survey, six specific schools including Theodore High School, Theodore, Alabama, were chosen for intensive study. The survey shows that Theodore High School is outstanding among the nation's secondary schools with regard to the number of courses that

are operating on an individual progress basis. In these courses students work on their own, using programmed instruction materials or study guides, progressing at their own rate of speed through the materials and exercises.

Such a course accommodates the different learning rates of students by giving them the time they need to learn to a criterion of mastery. Thus, course completion is defined by mastery and not by time. Instructors are present to give individual assistance to students as the latter encounter problems in understanding the materials. Instructors do not give lectures or group presentations; depending instead, on media such as texts, audio tapes, slides, films, etc., to present the course content. Theodore has "individualized" its courses in mathematics, languages, most of science, and commercial and industrial arts. The goal is to individualize all courses as rapidly as the necessary instructional materials can be produced or obtained.

The concern of this project is with the particular approach that Theodore has used in organizing its resources so that students can learn on an individual basis. The present document describes the school as a total organization with emphasis on the educational goals that direct its efforts. In order to examine the specific procedures followed in individualized instruction, the authors of this study found it necessary to focus on a single course at Theodore. A rationale for selecting the biology course as an example of course organization, concludes this initial report.

II. TECHNICAL DISCUSSION

A. THE COMMUNITY

Theodore High School is located in the unincorporated community of Theodore, Alabama about 15 miles south of Mobile. The community is relatively diffuse; the school, a few community buildings and a few small businesses form its nucleus. Development as an urban center ceased about a generation ago as Mobile-centered commerce shifted to the fringes of the larger city mainly in Theodore's direction. As a result of this, Theodore is now primarily a suburban residential area.

Over the past 20 years, occupational interests of the area have changed from an agricultural base to a base that now includes mainly the federal government (nearby Brookley Field), as well as local commercial and industrial enterprises. This change has had marked effect on the plans of Theodore's high school graduates. Whereas fewer than 5 per cent of the class of 1955 continued its education, 46 per cent of the class of 1965 plans to attend college, and an additional 25 per cent plans to obtain further formal training in professional, technical, and trade schools.

B. THE SCHOOL

The high school incorporates the seventh through the twelfth grades with a current enrollment of 1,453 students. The seventh grade has 239 students, the eighth grade 224, the ninth grade 296, the tenth grade 236, the eleventh 253, and the twelfth 205. Students for Theodore High School come from one of three elementary schools, two that have classes through the seventh grade and one through the ninth grade. The geographic area from which the school draws is approximately 100 square miles, with the result that more than 90 per cent of the students are transported by bus.

Theodore High School is a part of the Mobile Public School System, administered at the system level by a Superintendent hired by an elected Board of Education. The organization of the Mobile Public Schools is shown in Figure 1.

The Principal at Theodore High School is Mr. John W. Jackson, who has held this position for seven years. He is assisted at the staff level by Mrs. Katherine Hankins, Assistant Principal; Mrs. Pearl Heskew, Coordinator of Instruction; and Mr. George Whitt, Coordinator of Guidance. The instructional staff is organized into academic departments; each of the five largest is headed by a chairman. An Organizational Chart is shown in Figure 2.

In addition to Mr. Jackson's immediate staff of three, Theodore High School has 50 instructors. In the main, the instructional staff is young in experience, with a median tenure of less than four years. The typical teaching load consists of five periods in the classroom, one period devoted to non-instructional duties, and one period allotted for planning.

C. THEODORE'S INSTRUCTIONAL OBJECTIVE: INDIVIDUALIZATION

The present program at Theodore has its historical roots in an interest of the faculty expressed in efforts to develop new study materials during the 1958-1959 school year. With individualization of instruction as an objective, the staff gained valuable experience in the production of suitable instructional materials. Concepts, skills, and problems were sufficiently developed that by the time grant funding was potentially available in late 1960, the staff was able to produce a Master Plan and a proposal for funds to aid in its implementation.*

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*Mr. Jackson estimates that the Curriculum Improvement Program at Theodore has cost approximately $80,000 over the past 5 years. Of this amount, the International Paper Company provided about 50%; the Mobile County District, 25%; and the balance came from Theodore funds. The money was used: (1) to pay the salary of a Coordinator of Instruction for four years, (2) hiring teachers (about 286 man weeks) during the summer months to prepare study guides, (3) about 60 man weeks of clerical time to type and publish materials, and (4) to purchase publication supplies.

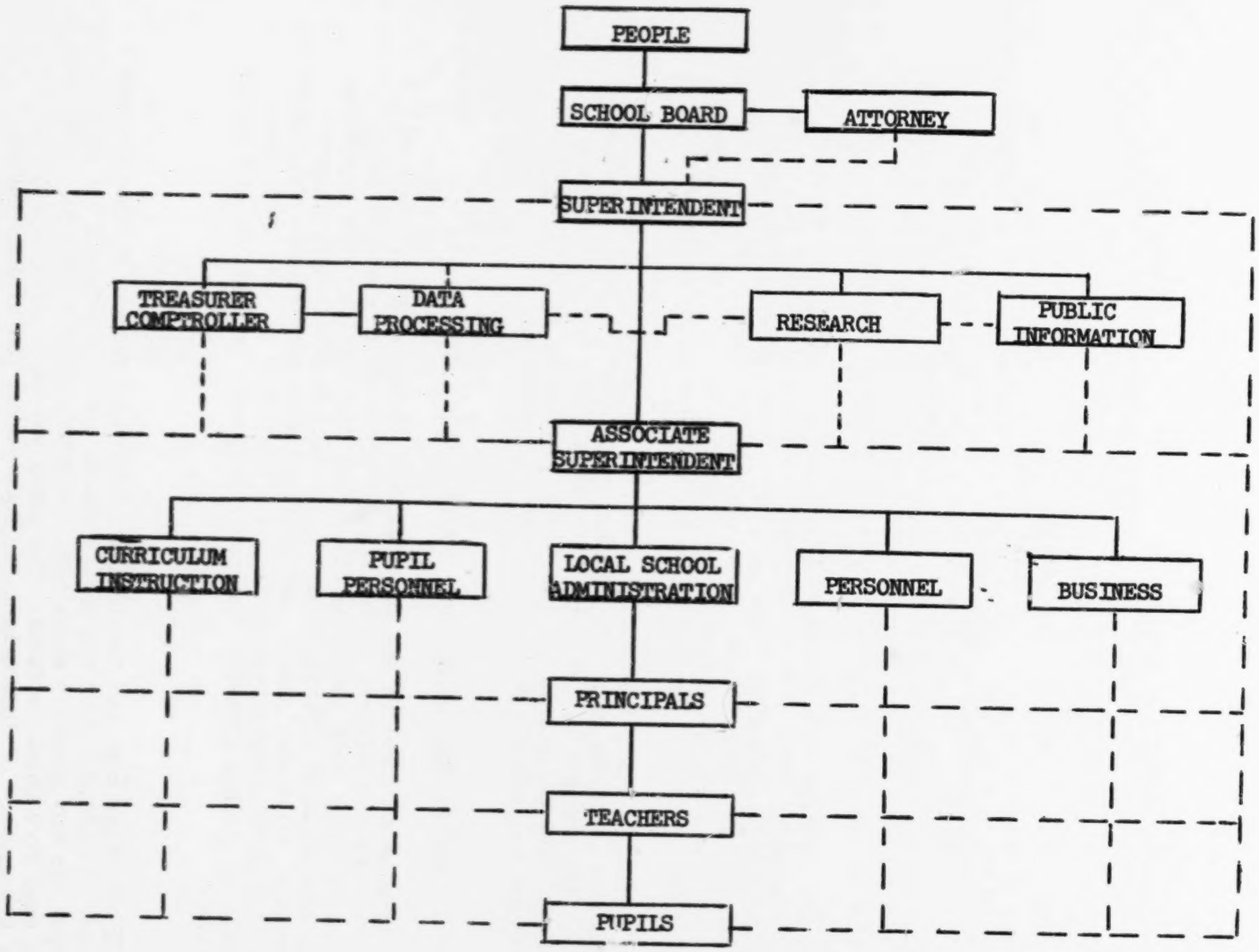

Figure 1. Organization Chart for Mobile Public Schools, 21 January 1965

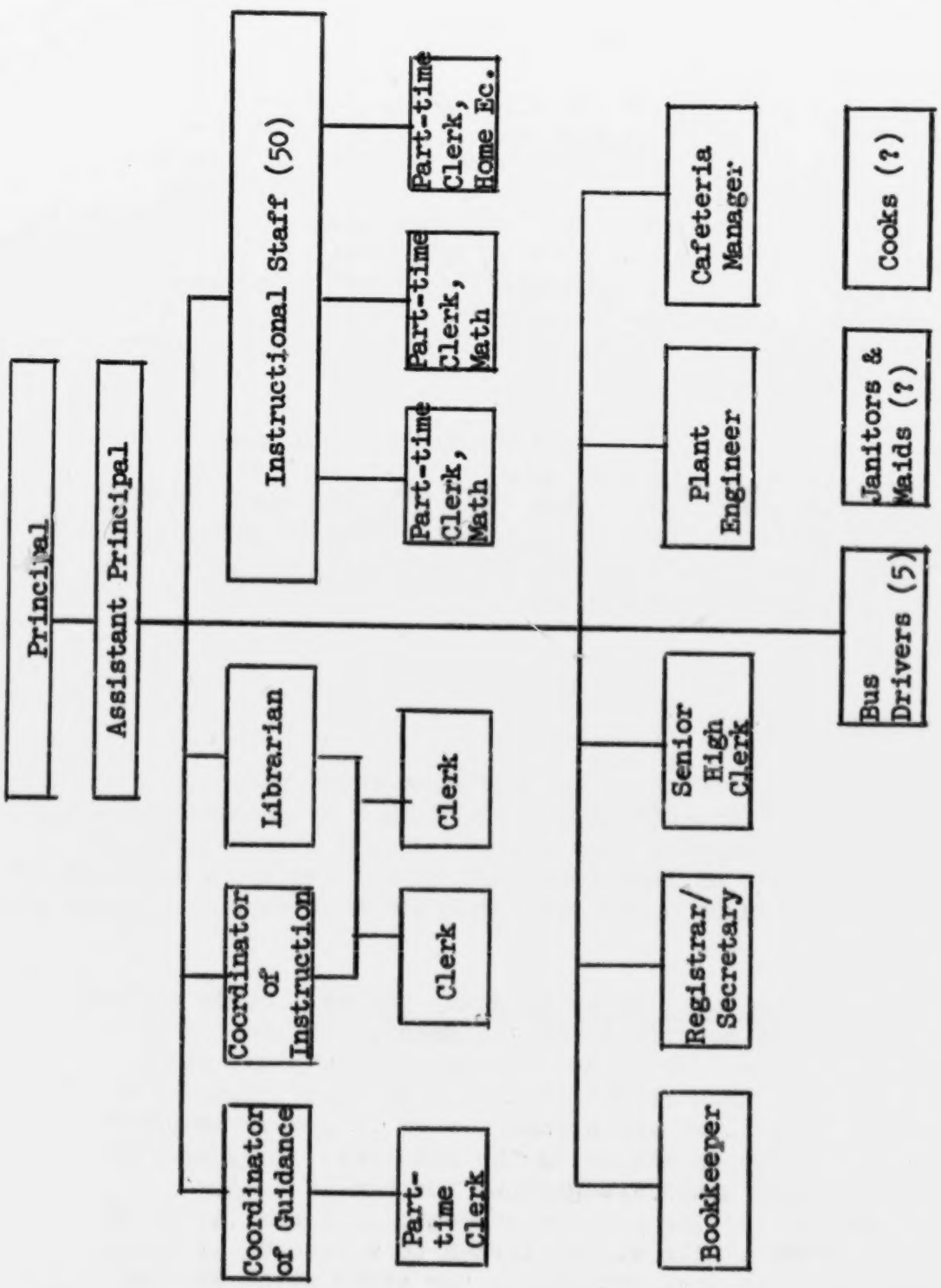

Figure 2. Organization Chart for Theodore High School, 1965-1966 ⟸ ?

The Theodore Master Plan states a number of objectives adapted from its acknowledged source: a series of recommendations of the National Association of Secondary School Principals Commission on the Experimental Studies of the Staff in Secondary Schools. A more recent expression of the over-all objective of the instructional program is found in the Theodore High School 1964 Curriculum Guide for Individualizing Instruction: ○

> "Individualizing the Instructional Program. By individualized instruction, we mean that each student may progress independently of other members of the class and may receive teacher help as he needs it. Each student progresses at his own comfortable speed. Though in all subjects we do not accomplish individual progress to the same degree, our ultimate aim is to individualize the total instructional program, so that every teacher's plans and procedures will take into account the unique needs of each individual in the class. Teachers in different subject areas individualize their instruction in different ways.
>
> "For instance, in mathematics each student follows the same sequence and works through identical assignments. In history, however, students will work on the same topics in the same sequence, but with individualized assignments. Smaller groups, at times the whole class, may be given the same assignment for survey and background study. These two subjects illustrate extremes."

D. MEDIA USED FOR INDIVIDUALIZATION

The individualization of instruction is an objective which poses problems in the selection of media and in organizational planning. A testament of Theodore's sophistication is found in the ability of its planners to distinguish between the objective of individualization and the means by which it is achieved. The 1964 Curriculum Guide distinguishes four ways to individualize instruction:

> 1. "We individualize teaching by using study guides. Study guides, calling for a variety of materials and equipment, provide for maximum individualization. Study guides are written plans which guide a student in pursuance of his studies. In these guides the teacher determines objectives and arranges them in proper sequence for the student to follow in mastering the material. They provide the student with predetermined assignments for him to follow. Instead of the teacher telling all the students or a smaller group to read a chapter, view a film strip, listen to a record, or write a report, he writes these instructions in the study guide so that each student may progress at his own speed from one assignment to

another. After finishing one assignment, the student will know what to do next. The study guide also tells the student when to report to the teacher for conferences and when to take a test."

2. "We individualize teaching with programmed instruction. Programmed materials provide for maximum individualization. Usually all the material needed to master certain information or skills is included within the programmed booklet. Some courses use programmed materials almost exclusively, while others use them merely as an aid in teaching certain concepts or skills."

3. "We individualize teaching by giving special assignments. Making individual assignments is an effective method, especially appropriate in individualizing English and social studies courses. For these subjects using group processes for effective learning, personal assignments assure each student's working with materials and ideas pertinent to his development at a given time."

4. "We individualize by teaching in levels. Instructional plans for common learning subjects are developed in three levels of difficulty. We refer to them as level 1, level 2, and level 3: (1) advanced--for the more able students; (2) regular--for average and above average students; (3) basic--for students who have more than average difficulty with a particular subject."

E. SPACE AND FACILITIES

The physical plant at Theodore High School is a complex of separate wings and buildings connected by numerous corridors and breezeways. As the student population has increased and as new instructional areas have been added, the school has correspondingly expanded. The result is a sprawling, airy, naturally lighted complex of several vintages that looks out on courtyards and rural landscape.

There are about 20 standard sized classrooms, two double-sized rooms with folding partitions, a mathematics laboratory, a home economics laboratory, a combination classroom and laboratory for chemistry and physics and another for biology, a language laboratory with 30 stations, an automotive shop, band and choral rooms, a cafeteria, a library, and an auditorium-gymnasium.

A floor plan of the school is shown in Figure 3.

The faculty at Theodore High School has pursued its objectives related to individualization within the constraints imposed by the conventional architecture of the school. The rearrangement of space has not been viewed as a major problem. Typically, the three functions of individual study, mastery testing, and small group discussion occur simultaneously within the same medium-sized classroom.

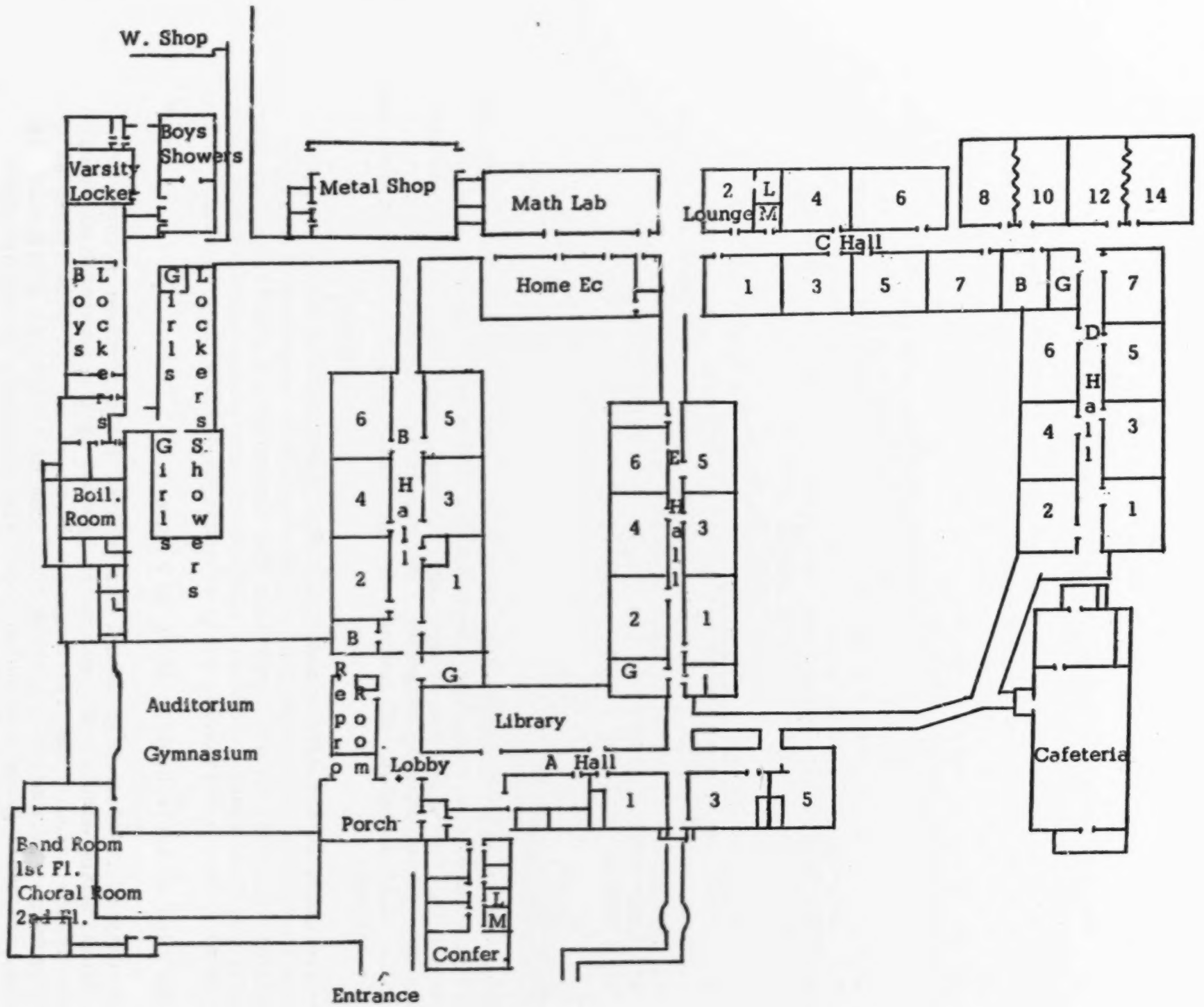

Figure 3. Theodore High School Floor Plan

F. NOTEWORTHY ORGANIZATION FEATURES

To the casual observer, Theodore High School appears little different than the typical American secondary school. Buzzers sound, students change classes, seniors graduate at age 18, the school year consists of two semesters ending in June, there is student government, there are athletic teams and assemblies; in short, a surface view provides nothing startling or unusual.

However, in achieving its objective of individualization, Theodore spends on the following unusual, if not unique, organizational procedures:

1. Revolving Period. The time from 9:12 to 10:02 each day is designated as the revolving period. In effect, students are not scheduled for a specific class during this time. Assemblies are scheduled on this period. If a teacher wishes to instruct a large group (for instance, a combination of two or more of his classes) the joint class meeting can be scheduled for this period. Normally, however, students attend one of their regular classes during this period on a revolving schedule. For example, on the first day of school a student goes to his first period class during this time, on day two he goes to his second period class, on day three, period three, and so on through day six, period six. Since the school has six regular periods each day, on day seven he begins the cycle over again by going to his first period class during the revolving period, continuing this six day cycle throughout the school year.

2. Student Flexibility in Changing Schedule. The fact that a given student's activities are not tied with an instructor's presentation or with the activities of others in his class makes it possible for the student to change his usual schedule. Theodore has provided a procedure for this. If a student needs two contiguous periods to complete an experiment or project, he may arrange for this merely by getting permission to be absent from one class and present in the other. Similarly, if he needs the resources of the library to complete an assignment, he can arrange to study in that area instead of his usual classroom.

3. Large Group Instruction. There are times when an instructor may wish to present a lecture, demonstration, or film to all classes in a particular subject. He obtains the space for this through the Coordinator of Instruction, and the revolving period provides the time.

4. Student Teacher Assistants. With a teacher's approval, students are allowed to schedule one period as a teacher assistant. Some teacher assistants work in the classrooms taking roll, checking materials in and out, cleaning laboratory equipment, and generally making themselves useful in nonprofessional

tasks. Others work in the office, library, and in the reproduction shop. Approximately 100 of the most academically successful students eagerly volunteer for this privilege. They are not compensated.

5. Health and Personal Development Classes. Health and personal development classes (HPD) at Theodore meet on alternate days with Physical Education. All students in the upper four grades attend these classes. Basically, they provide guidance and instruction in all HPD matters, but they also serve two important organizational functions relative to the objective of individualization. These are discussed below:

HPD classes are used as a conscious communication medium to orient students to Theodore's instructional objectives and organizational innovations. During the five years that changes have been occurring at the school, the student population has been continually apprised of what was happening. The school administration believes that the absence of significant student and parent resistance to the changes which were made is due in part to the orientation conducted in HPD classes.

Theodore has tried to group students only for instruction. This has resulted in elimination of both the traditional "homeroom period" and the "study hall." A second function of the HPD class is to provide a location for school-wide activities which typically occur in the homeroom. Thus student government, club organization, school-wide aptitude testing, etc., take place in HPD classes.

6. Self-Pacing. From the day a student enters Theodore High School, he is told and shown through the treatment he receives that he must take responsibility for his own education. Virtually every class is organized so that a student can work at a speed commensurate with his individual capacity to attain the skills and knowledge that comprise the course. In order to ensure that each student is working to capacity, the instructor frequently meets with him to jointly establish expected performance goals and to review past performance. In those courses which operate at different levels of difficulty, the instructor and student review the appropriateness of the level at which the student is working and make necessary adjustments. In either case, the wishes of the student are heavily weighted in the decisions made. The instructor encourages the student to set goals that are attainable, yet sufficiently challenging to cause the student to stretch, in reaching them.

G. THE ORGANIZATION STUDIED AT THEODORE

Much of the early impetus for individualizing instruction came from the appearance on the market of programmed texts such as the TEMAC mathematics materials. At that time, educators accepted the general notion that publishers

would soon be producing programmed texts in all subjects. These materials have not been forthcoming, so as a consequence, schools such as Theodore have had to devise their own instructional materials in order to individualize those courses for which programmed texts are not available or available programmed texts are not acceptable to the school.

A very promising solution to this problem has been found in the use of study guides. These guides are usually produced by an instructor and in effect "program" the course so that a student is directed through the sequence of activities he must successfuly complete in order to receive credit for the course. The biology course at Theodore High School is an outstanding example of a course that has been organized for individual progress and uses a study guide as a means to direct the work of students. The authors of this study believe that this particular way of organizing a course represents a truly significant educational innovation that should be brought to the attention of the general educational community. For this reason, the balance of the study as it pertains to Theodore will focus on the biology course. The next document in this series, TM-1493/111/00, contains a detailed descriptive analysis of the biology course. TM-1493/112/00 completes the series of reports about Theodore with a systems analysis of the biology course and includes the results obtained through computer simulation of experimentally manipulating the organization of the course.